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ABSTRACT

This paper reports the results of an SAT I field trial which examined test performance and efficiency of test timing for students with disabilities. A prototype SAT I test was administered to 1,113 students with disabilities in December 1992, in special formats and using special accommodations, to obtain information about the level of performance and amount of time used by students with hearing, learning, visual, and/or physical disabilities. The test was available in braille, large type, regular type, cassette tape, and reader's script versions. Students taking regular-type and large-type versions were given 1.5 times the standard amount of time for each section; other formats were given at least double the standard time per section. The great majority of students were able to complete the entire test sections, irrespective of test format. Math sections of the test displayed wider variation in completion rates by test format and by test section than did verbal sections. Verbal scores were lowest for students taking the script version and highest for those taking the regular type version. Math scores were lowest for students using the braille version and highest for those taking the regular type version. Results are compared to results of a spring field trial. (JDD)

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Establishing Timing Limits for the New SAT for Students with Disabilities

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This past March, the College Board introduced the SAT I: Reasoning Test (SAT I) for the national testing program as well as for students with disabilities. Among the changes in the test are different section configurations; longer reading passages with an emphasis on critical reading skills; a new question type in the mathematical section for which students must supply an answer rather than choose among options; and optional use of a calculator on the math portion of the test. The purpose of this paper is to report the results of an SAT I field trial which examined test performance and efficiency of test timing for students with disabilities.

Over the past five years a number of field trials have been carried out to investigate the various technical, operational, and policy issues related to the development of the SAT I. A large field trial was held in the spring of 1992 involving over 180,000 students from about 2,400 schools. A portion of that field trail focused on a prototype of the SAT I administered under standard timing conditions. The results of that and earlier field trials have been used to develop content and statistical specifications, estimate test speededness, and examine reliability, validity, and differential item functioning.

As part of the commitment to assure fair testing of examinees with disabilities, in December 1992 Educational Testing Service (ETS) and the College Board conducted special field trial of the SAT I for students with disabilities. The prototype SAT I from the spring 1992 field trial was administered in special formats (e.g., large-type, braille) and using special accommodations (e.g., recorder/scribe). The purpose of

the field trial, as stated in a letter inviting high schools to participate, was "to obtain information about the level of performance and amount of time used by students with hearing, learning, visual, and/or physical disabilities." Another purpose was to solicit feedback from students, teachers, and counselors about changes in the new tests and the accommodations and formats used in the field trial.

DATA COLLECTION

High School Recruitment

With the help of the ETS Committee on People with Disabilities, schools with programs for students with specific disabilities were identified and invited to participate in the field trial. In addition, high schools that had tested students with disabilities in the past year were invited to participate.

As an incentive to participate, schools received student score rosters containing estimated SAT scores and national percentiles. Interpretive information was also provided. Following the field trial, each participating school also received copies of the SAT I in the various test formats along with scoring instructions. Students could use these practice materials to prepare for the SAT I. It was emphasized that scores from the field trial could not be used for college admissions.

Schools were asked to test high school juniors and seniors with documented disabilities, that is, students who met the eligibility requirements to take the operational SAT under nonstandard conditions. In order to ensure that all disability groups were represented in the

field trial sample, schools were asked to identify the number of students by disability group: blind/visually impaired, deaf/hard of hearing, learning disabled, physically disabled, or psychological/emotionally disabled.

A few weeks before the field trial, all participating high schools were sent a test preparation leaflet containing test directions and sample questions. The leaflet was used to familiarize students with the test directions and question types on the SAT I.

Administration

The field trail was held during December. Schools were allowed to schedule the test on any convenient day during that period. (Because of school closings, a few schools continued testing until early January.) Both group and individual administrations were allowed, although group administrations were encouraged. Students were allowed to test on two consecutive days if needed. Total testing time ranged from 3 hours, 50 minutes to 5 hours, 45 minutes, depending upon the test format administered. An additional 30 minutes were needed for distributing materials, reading instructions, and completing the questions on the answer sheet.

In addition to the test questions, examinees were asked basic demographic questions on the answer sheet. A separate Student Feedback Survey was administered within two days of the test while the student's memory of the testing situation was still fresh. The survey contained questions about test preparation, perception of adequacy of test timing, accessibility and use of calculators, type of disability, and type of format or accommodations used. Results of the survey are described by

Wendler and Wright (1994).

Testing Volume

Initially 118 high schools with around 2,000 eligible students expressed interest in the field trial. A total of 100 schools testing 1,113 students returned answer sheets in time to be considered for the analysis groups. (One school returned answer sheets too late to be included in the timing analyses, but was included in the survey analyses.)

DESIGN OF THE FIELD TRIAL

Accommodations

The test, consisting of three verbal and three mathematical sections, was available in braille, large-type, regular-type, cassette tape, and reader's script versions. Students using the cassette, braille, or script versions could make use of braille diagrams for the math figures. Students using the cassette version also used a printed version of the test (braille, large-type, or regular-type). Students coded their responses on machine-scannable answer sheets or large-block answer sheets; the use of a typewriter and recorder/scribe was also permitted. A sign language interpreter could be used for the spoken test directions. Students were allowed to use a calculator on the mathematical sections of the test. Other accommodations (e.g., magnifying glass, braille scratch paper) were also permitted.

Timing

No timing limits are given to students testing under SAT Services for Students with Disabilities. For the field trial, however, each section of the SAT I specified a maximum amount of time allowed. The

specific amount of time varied by test format. Students taking regular-type and large-type versions were given time and a half the standard time per section; other formats were given at least double the standard time per section.

RESULTS

Analysis Sample Screening

Originally, only college-bound juniors and seniors were to be included in the analyses. However, small sample sizes and a high proportion of students who did not indicate their grade level or who were in 10th grade led to the decision to include all available cases. Students who did not answer at least one question in a verbal or math section were excluded from the analysis of that portion of the test. A total of 1,113 students from 100 schools were included in the timing analysis. Table 2 presents demographic characteristics of these students.

Test Performance

Average verbal and math scores were calculated by test format. Since the disability of the student could not be determined from the answer sheet, level of performance by disability group could not be determined during this phase of the analysis. Test performance by disability group is provided in Wendler and Wright (1994).

Table 3 provides average scores by test format. Test performance for students participating in the spring 1992 field trial are included as a comparison group. All scores, both verbal and math, were lower for the group of students participating in the December field trial compared

to spring field trial participants. Verbal scores were lowest for those students taking the script version (mean = 292) of the test and highest for those taking the regular-type version (mean = 315) of the test. Math scores were lowest for students using the braille version (mean = 308) of the test and again highest for those taking the regular-type version (mean = 347).

Timing Analyses

Several indicators were used to assess speededness as part of the field trial: (1) percent of students completing test section, (2) percent of students completing 75% of the questions in test section, and (3) number of questions reached by 80% of students. Questions are considered "not reached" when a student makes no further marks on the answer sheet. Information on completion rates are found in Tables 4 through 7.

For the total group of students, speededness data look similar in both the spring field trial and the December field trial. Overall, a higher percentage of students in the December field trial completed each section of the test compared to the spring field trial. The only exception was the Math 2 section, where a slightly smaller percentage of December field trial students completed the section. However, students participating in the spring field trial tended to complete 75% of the questions in a test section at a higher rate than those in the December field trial. For the verbal sections of the test, 80% of the students with disabilities reached all questions in the section. For the mathematical sections of the test, 80% of these students reached almost all questions in a particular section. In the Math 1 section, 80% of

the students reached all but one question; in the Math 2 section, 80% of the students reached all but two questions.

Differences in completion rates are obvious across the different formats of the test. Most students appeared to have adequate time to complete the verbal sections of the test, irrespective of the test format. It should be noted, however, that sample sizes for braille, large-type, and script formats were very small and conclusions drawn from these groups must be treated as tentative. Cassette tape users showed the least amount of test speededness; number of students completing the verbal sections ranged from 80% to 98%. Large-type users showed the most test speededness; number of students completing the verbal sections ranged from 77% to 82%. While 80% of the students taking the regular-type, cassette tape, and script versions of the test reached all questions in the verbal sections, students taking braille or large-type versions of the test did not reach all questions.

Overall, the math sections of the test seemed to be more speeded than the verbal sections of the test for all formats. For verbal, completion rates tended to be in the 80% to 96% range; for math, completion rates tended to be in the 40% to 70% range.

The math sections of the test displayed wider variation in completion rates by test format and by test section. All test sections appeared to be somewhat more speeded for students taking the large-type and script versions of the test than for other students. For example, 48% of the students using large-type and 41% of the students using the reader's script completed the Math 1 section, compared to 67% of the students using regular-type and 83% using cassette. The Math 3 section

seemed to be less speeded for all students, regardless of the format of the test they used, compared to the other two math sections. For Math 3, 80% of the students across all formats reached all questions.

DISCUSSION

While some aspects of the SAT I field trial for students with disabilities mimicked the ways that students traditionally take the SAT under SAT Program for Students with Disabilities, other aspects of the field trial were somewhat "artificial." For example, students were allowed to use all accommodations they may use during a real test administration, such as alternate test formats, use of recorder/scribe, and use of typewriters and other specialized equipment. While students taking the SAT are allowed extended time, timing restrictions by section are not imposed on examinees.

Several things become apparent. First, the students participating in the December field trial appear to be young. Many were sophomores; many did not indicate their grade level, perhaps because schools were asked to test juniors and seniors. Second, a higher proportion of students left entire test sections blank than what was seen in the spring trial. Finally, verbal and math performance is lower for the students involved in the December field trial compared to those involved in the spring field trial. Lower performance may be attributed to students being younger in the December study, the number of test sections left blank, the interplay of disabilities with testing, insufficient section timing, lack of motivation on student's part, or

any combination of factors.

Nevertheless, some information about restrictive timing on an SAT can be derived from the field trial. For example, even with section timing being imposed, the great majority of students were able to complete the entire test section. This can be used to guide students and counselors in determining the amount of time a student might need when taking an individual administration of the SAT I. In addition, it is apparent that some test formats require more time per section than other formats. The act of running a cassette tape and rewinding it through a reading passage takes more time than simply skimming through a passage on a regular-type test book. Students using large-type formats present a special challenge. Although it is a printed media they use which does not require special time for "rewinding," students who are likely to use a large-type test appear to have disabilities whose nature requires more visual processing time. Using the same testing limits as used with regular-type students seemed to be somewhat inappropriate for large-type students. However, it should be noted that large-type sample sizes were very small.

This paper reported on issues related to timing on the SAT I for students participating in the December field trial. While it does not provide a definitive answer to what appropriate timing is for students with disabilities, it does provide a framework for further investigating the issue. As the SAT I is introduced, additional data relevant to section timing and total test timing will be routinely collected and analyzed.

REFERENCES

Wendler, C., & Wright, N. (1994, April). Reactions of Student with Disabilities to the New SAT. Paper presented at annual meeting of the National Council on Measurement in Education, New Orleans.

Table 1
Timing Limits by Section and Test Format

Test Section	Standard Timing	Field Trial Timing	
		Regular/Large-Type	Cassette/Braille/Script
Verbal 1	30	45	75
Verbal 2	30	45	75
Verbal 3	15	25	45
Math 1	30	45	60
Math 2	30	45	60
Math 3	15	25	30

Table 2
Demographic Characteristics of Students Testing in Field Trial

Demographic Variable	Percent
Gender	
Female	32
Male	68
Ethnic Group	
American Indian	1
Asian American	2
Black/African American	11
Hispanic	4
White	80
Other	3
High School GPA	
A+	1
A	2
A-	5
B	54
C	36
D, E, or F	2

Note. Total number of examinees = 1,113.

Table 3
Average Verbal and Math Scores for Field Trial Participants

Group	Average Verbal	n	Average Math	n
Spring field trial				
Total	387 (108)	29,369	443 (119)	16,272
December field trial				
Total	310 (99)	1,110	341 (96)	1,107
Regular-Type	315 (105)	782	347 (101)	780
Large-Type	307 (87)	71	340 (90)	71
Cassette Tape	303 (80)	141	323 (74)	140
Braille	294 (72)	5	308 (59)	5
Reader's Script	292 (59)	22	331 (92)	22

Note. Numbers in parentheses are standard deviations.

Table 4
Completion Rates for Spring and December Field Trials for Total Group[1]

Test Section	Spring Field Trial	December Field Trial
Verbal 1		
% completing section	87.50	89.50
% completing 75%	97.80	97.00
# items reached by 80%	--	35
Total # of items	35	35
n	9,995	1,055
Verbal 2		
% completing section	85.70	88.70
% completing 75%	98.90	98.30
# items reached by 80%	--	30
Total # of items	30	30
n	9,995	1,055
Verbal 3		
% completing section	71.60	89.40
% completing 75%	91.00	97.00
# items reached by 80%	--	13
Total # of items	13	13
n	9,995	1,055
Math 1		
% completing section	62.60	68.10
% completing 75%	97.50	96.60
# items reached by 80%	--	24
Total # of items	25	25
n	9,990	1,040
Math 2		
% completing section	67.90	60.10
% completing 75%	98.00	93.30
# items reached by 80%	--	23
Total # of items	25	25
n	9,990	1,040
Math 3		
% completing section	93.70	97.00
% completing 75%	97.80	98.50
# items reached by 80%	--	10
Total # of items	10	10
n	9,990	1,040

[1]# items reached by 80% not provided for spring field trial.

Table 5
Completion Rates for Spring and December Field Trials
by Test Format

Test Section	Regular	Large	Braille	Cassette	Script
Verbal 1					
% completing section	89.10	81.50	80.00	97.70	86.40
% completing 75%	96.90	90.80	100.00	98.50	100.00
# items reached by 80%	35	35	35	35	35
Total # of items	35	35	35	35	35
n	740	65	5	130	22
Verbal 2					
% completing section	89.60	81.50	96.90	80.00	81.80
% completing 75%	98.40	93.80	100.00	100.00	100.00
# items reached by 80%	30	26	27	30	30
Total # of items	30	30	30	30	30
n	740	65	5	130	22
Verbal 3					
% completing section	89.50	76.90	100.00	96.20	81.80
% completing 75%	97.00	89.20	100.00	99.20	95.50
# items reached by 80%	13	12	13	13	13
Total # of items	13	13	13	13	13
n	740	65	5	130	22
Math 1					
% completing section	67.00	47.70	60.00	83.10	40.90
% completing 75%	96.80	90.80	100.00	98.50	90.90
# items reached by 80%	24	21	23	25	23
Total # of items	25	25	25	25	25
n	730	65	5	130	22
Math 2					
% completing section	59.70	60.00	60.00	66.20	36.40
% completing 75%	93.00	98.50	100.00	93.10	86.40
# items reached by 80%	23	23	23	23	21
Total # of items	25	25	25	25	25
n	730	65	5	130	22
Math 3					
% completing section	97.00	92.30	100.00	100.00	86.40
% completing 75%	98.60	96.90	100.00	100.00	90.90
# items reached by 80%	10	10	10	10	10
Total # of items	10	10	10	10	10
n	730	65	5	130	22